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SUPPLEMENTAL SUBSURFACE INVESTIGATION – RD INVESTIGATIVE ACTIVITIES WASTE DISPOSAL, INC. SUPERFUND SITE

Prepared for

United States Environmental Protection Agency

Prepared by

TRC

Irvine, California

Representing

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1.0 INTRODUCTION

1. Provided in this workplan are the rationale, procedures and schedule for implementation of the Supplemental Subsurface Investigation (SSI) - Remedial Design (RD) Investigative Activities at the Waste Disposal, Inc. (WDI) Superfund Site (Site) located in Santa Fe Springs, California.

2. This SSI will provide critical Site-specific data regarding the characteristics of the fill material, buried waste and native soils and their relationships to existing onsite structures. The characteristics that will be investigated are as follows:
   - Extent of waste near or beneath onsite structures in Site Areas 1 and 8.
   - Chemical and physical characteristics of the fill, waste and native soils.

3. Results of the SSI will be analyzed and summarized in a 30% Workplan that will be used as a bidding document for the proposed Technical Memorandum No. 14 (TM No. 14) - Focused Excavation Treatability Study. TM No. 14 is a focused project that will generate critical performance and cost data to assist in the definition and evaluation of the remedial alternatives in the Remedial Investigation/Feasibility Study (RI/FS), including data on the extent of the buried waste and costs of waste excavation at the Site.

4. The following technologies and soil activities will be used to conduct the investigation:
   - This investigation will be conducted in phases with the specific scope of each phase determined by the results of the previous phase. The first phase of the investigation is as follows:
     - Fifty-eight (58) continuously sampled direct push test borings to depths of 20 feet below ground surface (bgs).
     - Eight (8) hollow-stem auger test borings drilled and sampled to depths of 35 to 40 feet bgs.

     A subsequent phase of investigation may be performed if significant data gaps still exist following completion of the above test borings.
   - A laboratory testing program will be performed on samples collected during the investigation to evaluate the chemical and physical properties of the fill material, buried waste and native soils.

5. Environmental and geotechnical engineering analyses necessary to complete the design of the Focused Excavation Treatability Study are described below. The following activities will be performed at the completion of the investigation:

   - Fill in data gaps on the extent of buried waste in Areas 1 and 8, particularly adjacent to and beneath existing buildings.
   - Calculate slopes that excavations will have to be laid back to in order to be stable.
   - Determine which existing buildings, underground utilities, or other structures, if any, will require shoring or underpinning in order to maintain their stability during waste removal activities.
   - Determine if existing buildings, underground utilities, or other structures will need to be removed in order to excavate buried waste.
   - Design of necessary shoring and/or underpinning needed to support existing buildings, underground utilities, or other structures during waste excavation activities.
   - Evaluate excavation and handling characteristics of the excavated waste and fill material.
   - Calculate the volume of waste and fill material that will be excavated.
   - Determine the size and configuration of the engineered disposal trench necessary for consolidation of the excavated waste over the reservoir in Area 2.
   - Calculate the volume of imported fill material needed to complete backfilling where the buried waste was excavated.
   - Evaluate work required for restoration of areas disturbed during the construction phase of the Focused Excavation Treatability Study.
   - Amend the Site Health and Safety Plan (HSP) to incorporate unique aspects of the Focused Excavation Treatability Study.
   - Prepare an engineering cost estimate for implementation of the construction phase of the Focused Excavation Treatability Study.
   - Prepare a detailed schedule for the construction phase of the Focused Excavation Treatability Study.
   - Prepare construction specifications, plans and a bid document for use in the solicitation and evaluation of bids from prequalified Engineering, Procurement and Construction (EPC) contractors for the construction phase of the Focused Excavation Treatability Study.

2.0 SUPPLEMENTAL SUBSURFACE INVESTIGATION ACTIVITIES

2.1 RESEARCH OF EXISTING INFORMATION

1. Existing information will be researched in an attempt to determine the type of onsite building foundations that may be affected by the Focused Excavation Treatability Study. Building owners and tenants will be contacted as well as the City of Santa Fe Springs to inquire if any such information exists and, if so, obtain and review copies. A detailed reconnaissance will be performed of the interior and exterior conditions of each building. This reconnaissance will be conducted by an experienced civil engineer. Written, photographic and video documentation will be made of the existing conditions of the buildings.

2.2 DIRECT PUSH TEST BORINGS

1. A total of 58 direct push test borings are proposed for the SSI. Figure 1 shows the approximate locations of these test borings.

2. The purpose of the direct push test borings is to fill data gaps in the extent of buried waste in Areas 1 and 8. Particular emphasis was placed on defining subsurface conditions adjacent to existing buildings. Locations were selected based upon examination of existing subsurface data summarized on Figure 5.2 in the Remedial Design Investigation Activities Summary Report (TRC, 1999).

3. Prior to the commencement of drilling activities, the locations of the proposed borings will be identified with wooden stakes or white spray paint as measured from a definable site feature for easy conversion to site plans and figures. A notice will be filed with Underground Service Alert (USA) to locate exiting subsurface utilities at each parcel. The notice will be made a minimum of 48 hours in advance of any field work being performed.

4. Drilling may only be performed at the "cleared" borehole locations. If areas are deemed questionable, the location will be checked using hand-augering techniques to a depth of 5 feet bgs.

5. Each direct push test boring will be drilled to a depth of approximately 20 feet bgs. This depth was selected based on existing data, which indicates the maximum depth of buried waste in

Areas 1 and 8 is approximately 18 feet bgs, while the average depth is approximately 12 feet bgs (TRC, 1999). The thickness of the waste ranges from approximately 1.4 feet thick to 17 feet thick, with 5.4 feet being the average waste thickness. If a boring is still in waste at 20 feet bgs it will be continued until the bottom of the waste is found. The direct push drill rig will be equipped to drill beyond 20 feet bgs, if necessary.

6. Each test boring will be continuously sampled and the soil samples will be handled as described in the Field Sampling and Analysis Plan (FSAP) (TRC, 1997a). The existing FSAP for the Site has been modified to address the field sampling, waste characterization, and sampling and analysis activities for this investigation. Revisions in the addendum address the objectives and rationale of the proposed SSI sampling and the procedures for obtaining and handling samples for geotechnical analysis. The FSAP Addendum describes the kind of samples that will be collected and specifies the level of Quality Assurance and Quality Control (QA/QC) required as outlined in the Quality Assurance Project Plan (QAPP) (TRC, 1997b) and is included as Attachment B.

7. The Engineer/Geologist collecting the samples will record the appropriate portions of the following information for each sample collected, as appropriate for the sample type. The information will be recorded in a field logbook or on a field data sheet using indelible ink.
   - Name of sampler.
   - Sample identification number(s).
   - Physical conditions during sampling.
   - Climatic conditions.
   - Date and time of collection.
   - Sample collection procedure/equipment.
   - Sample identification and volume of sample(s).
   - Types of sample containers used.
   - Parameters requested for analysis.
   - Duplicate samples collected and identification numbers.
   - Field observations.
   - Decontamination procedures.
   - Name of courier and laboratory.

8. Each of the direct push test borings will be logged in the field. Logged information will include the following:
   - Boring location and number.
   - Date and time drilled.
   - Site conditions (e.g., surface covered with asphalt pavement).
   - Soil classification according to the Unified Soil Classification System (USCS).
   - Characteristics (e.g., color, density, moisture content, staining and odor) of soils encountered.

- Depths of any buried waste encountered.
- Perched ground water conditions, if any.

9. After completion of drilling and sampling, the borings will be backfilled with hydrated bentonite to the ground surface. If the ground surface at the boring location is covered with pavement or a floor slab, it will be patched with an appropriate material. The exploration locations will be cleaned and restored to the condition they were in prior to the borings being done. The direct push technology has the advantage of not generating soil cuttings which require management.

10. Augers (including hand augers and hydraulically pushed sample units) will be decontaminated prior to and between drilling at each borehole location by steam cleaning or pressure washing. Decontamination fluids will be contained in 55-gallon DOT-approved drums and staged in Area 2 of the Site. Refer to Standard Operating Procedure (SOP) G in the QAPP for specific details regarding decontamination procedures.

2.3 HOLLOW-STEM AUGER TEST BORINGS

1. A total of 8 hollow-stem auger test borings are proposed for this SSI. Figure 1 shows the approximate locations of these test borings.

2. The purpose of the hollow-stem auger test borings is to fill data gaps in the extent of buried waste in Areas 1 and 8, and to obtain soil samples for geotechnical laboratory analyses. In selecting the locations of the hollow-stem auger test borings, particular emphasis was placed on defining subsurface conditions adjacent to existing buildings. Locations were selected based upon examination of existing subsurface data summarized on Figure 5.2 in the Remedial Design Investigation Activities Summary Report (TRC, 1999), and the locations of the direct push test borings described in the previous section.

3. Each hollow-stem auger test boring will be drilled to a depth of approximately 35 to 40 feet bgs. This depth was selected based on the maximum anticipated excavation depth of 18 feet bgs to remove buried waste in Areas 1 and 8, and to obtain sufficient subsurface soil geotechnical data to support design of shoring and underpinning systems. Each test boring will be sampled at approximately 5-foot vertical increments to the boring termination depth. Sampling depths may be varied in order to obtain samples of particular

subsurface strata. The soil samples will consist of relatively undisturbed drive and thin-wall tube samples. Soil samples will be handled as described in the FSAP (TRC, 1997a).

4. Each of the hollow-stem auger test borings will be logged in the field as described in the previous section.

5. After completion of drilling and sampling, the hollow-stem auger test borings will be backfilled with a bentonite grout to the ground surface. If the ground surface at the boring location is covered with pavement or a floor slab, it will be patched with an appropriate material. The exploration locations will be cleaned and restored to the condition they were in prior to the borings being done. Drill cuttings will be placed into 55-gallon DOT-approved drums and staged in Area 2 for subsequent disposal with the buried waste excavated from Areas 1 and 8.

6. Augers and sampling equipment will be decontaminated according to procedures outlined in SOP G in the QAPP. Decontamination fluids will be contained in 55-gallon DOT-approved drums and staged in Area 2 of the Site.

2.4 INDOOR DIRECT PUSH TEST BORINGS

1. Twenty-four direct push test borings will be installed inside existing buildings. These borings will be drilled and sampled using limited access direct push drill rigs to a depth of 20 feet bgs. Access holes, approximately 4 inches in diameter, for the drilling equipment will be cut through the concrete floor slabs using coring equipment or jackhammers. The work will be done outside of normal business hours to minimize the impact on the building occupants. Care will be taken to restore the exploration locations to the condition they were in prior to the investigation activities.

2. These indoor direct push test borings performed as part of the SSI will be drilled, sampled, logged and abandoned as described above in Section 2.2. Refer to SOP R in Attachment A for specific details regarding procedures for indoor direct push borings.

2.5 ADDITIONAL DIRECT PUSH TEST BORINGS

1. If the planned direct push and hollow-stem auger test borings described above leave significant data gaps in the extent of buried waste in Areas 1 and 8, an additional set of direct

push test borings will be performed. The locations of additional direct push test borings will be determined based on the results of the test borings described in the previous sections.

2. Additional direct push test borings performed as part of the SSI will be drilled, sampled, logged and abandoned as described in the sections above.

2.6 LABORATORY TESTING PROGRAM

2.6.1 ANALYTICAL LABORATORY TESTING

1. Soil samples from the direct push and hollow-stem auger borings will be collected and selected samples will be delivered to a state-certified analytical laboratory for classification and evaluation of their chemical characteristics. There will be one sample collected from each media for a total of 3 samples from each direct push boring. Select samples will be analyzed by the following EPA methods:
   - Volatile Organic Compounds (VOCs) by Methods 5035 and 8260 (Refer to SOP O in the QAPP for details regarding Method 5035).
   - Semivolatile Organic Compounds (SVOC) by Method 8270.
   - Metals by Methods 6010A, 7060, 7421, 7470 and 7740.
   - Pesticides and Polychlorinated Biphenyls (PCBs) by Method 8081.
   - Total Recoverable Petroleum Hydrocarbons (TRPH) by Method 418.1.

2. Samples to be analyzed will typically be from the fill material overlying the buried waste, the buried waste and from native soils underlying the waste. Two samples from each media (fill and native soil) will be analyzed from Parcels 12, 28, 29, 43 and 44 for a total of 16 samples. One sample from each media (fill and native soil) will be analyzed from Parcels 3, 7, 21, 22, 24, 32, 37, 41 and 42 for a total of 10 samples. If waste is encountered beneath the buildings, one waste sample from each building will be analyzed with a maximum number of 10 samples being analyzed. The intention of this testing is to verify that the concentration of any Chemicals of Concern (COCs) in these materials are below the remediation goals for the site. Hence, verifying that, from a geochemical standpoint, the overlying fill soils can be reused for backfilling the excavations and that the native soils can be left in place. Sample selection for laboratory analysis will be based on visual observations of the available samples and on field measurements such as photoionization detector (PID) readings.

3. During the investigation, soil samples will be analyzed using EPA Method 418.1 for total TRPH. This data will be used to determine if a correlation exists between TRPH and other constituents (i.e., VOCs, benzene, etc.). Samples for TRPH will be analyzed by the laboratory

during the investigation phase. If a correlation is identified TRPH analysis may be performed in the field during excavation activities as a screening tool to indicate when excavations can be stopped.

4. Those samples that are not analyzed will be placed in 55-gallon DOT-approved drums and staged in Area 2 for subsequent disposal with the buried waste excavated from Areas 1 and 8.

2.6.2 GEOTECHNICAL LABORATORY TESTING

1. Relatively undisturbed soil samples of the fill material, the buried waste and native soils from the hollow-stem auger test borings will be delivered to a licensed geotechnical testing laboratory equipped to handle contaminated materials. An estimated 31 split-spoon samples and 31 thin-wall tube samples will be taken from the hollow-stem auger borings for possible geotechnical laboratory testing. As appropriate, laboratory tests will be run to classify and evaluate the engineering properties of selected samples. Samples will be selected to be representative of the range of physical conditions of the fill material, waste and native soils encountered throughout Areas 1 and 8. They will be selected based on visual classifications and penetration resistance. The proposed testing program will consist of the following number and types of tests:
   - Eighty (80) moisture content/density tests (ASTM D2216).
   - Ten (10) grain size analyses (ASTM D2216).
   - Ten (10) Atterberg Limits tests (ASTM D4318).
   - Sixteen (16) unconfined compression tests (ASTM D2166).
   - Six (6) direct shear tests (ASTM D3080).
   - Six (6) triaxial shear tests (ASTM D2850).

2. Quality control (QC) procedures will be followed during Collection of the geotechnical samples following ASTM Procedures D1586, D1587 and D3550. A more detailed description of these procedures is included in Section 5.1.2.3.2 of the FSAP Addendum (in Attachment B).
   - ASTM Procedures D1586 and D3550
     - Samples will be obtained at 5-foot intervals using a split-spoon sampler.
     - Split-spoon sampler will be driven 18 inches and the number of blows will be counted and recorded.
     - Samples will be handled in a manner as to minimize soil disturbance.
     - The percent recovery should be measured during the sampler disassembly.

- Samples that appear to be disturbed or questionable shall be discarded. Filling of depressions in the end rings with additional soil shall not be permitted.
- Record observations of the soil remaining in the shoe for structure, consistency, color and condition on the boring logs.
- Label the samples and transport samples.

- ASTM Procedures D1587
  A more detailed description of these procedures is included in Section 5.1.2.3.3 of the FSAP Addendum (in Attachment B).
  - Samples will be obtained at 5-foot intervals using a thin-walled sampler.
  - The 3-inch-diameter thin-walled sampler will be pushed 30 inches into the soil using the hydraulic system on the rig.
  - Sampler will be withdrawn from the formation as carefully as possible in order to minimize the disturbance of the sample.
  - Sample length shall be measured at all stages of recovery.
  - Label the samples and transport samples.

3. The laboratory testing program is based on anticipated soil conditions and some alterations may be necessary should different conditions be encountered during subsurface explorations. The geotechnical laboratory tests will be conducted in accordance with applicable American Society of Testing and Materials (ASTM) standards.

2.7 ENGINEERING ANALYSES

1. Following completion of the field exploration and laboratory testing programs described above, the data will be compiled along with existing data and the following engineering analyses performed:
   - Extent of buried waste in Areas 1 and 8 will be refined and marked on a scaled drawing of the Site. This drawing will include the locations of known existing buildings, underground utilities, pavements and other structures.
   - Geotechnical engineering parameters will be provided for slope stability analyses necessary to evaluate the inclination excavation slopes will have to be laid back to in order to be stable. Slope stability analyses will be completed by an EPC firm in the 90% Workplan.
   - Evaluations will be performed to determine if any existing buildings, underground utilities or other structures will require shoring, underpinning or removal in order to excavate the buried waste.
   - Geotechnical engineering parameters will be provided to support design of any required shoring or underpinning systems. Design will be completed by an EPC firm in the 90% Workplan.

- Calculate volumes of waste and fill materials that will have to be excavated and determine what volume of new fill material will have to be imported to the Site to complete backfilling of the excavations.
- Determine the size and configuration of the engineered disposal trench necessary for consolidation of the excavated wastes over the reservoir in Area 2.
- Geotechnical and physical parameters will be provided to allow the EPC firm to evaluate excavation and handling characteristics of the excavated waste and fill materials in the 90% Workplan.

2.8 30% WORKPLAN FOR TM NO. 14 TREATABILITY STUDY

1. Results of the SSI field, laboratory and engineering evaluations will be summarized in the 30% Workplan, which will be used as a bidding document for TM No. 14. The 30% Workplan will include the following:
   - Logs of the test borings.
   - Analytical and geotechnical laboratory test results.
   - A figure showing the refined extent of buried waste in Areas 1 and 8.
   - Excavation slope stability analysis parameters.
   - Shoring/underpinning design parameters.
   - Geotechnical characterization of waste and fill material to be excavated.
   - Estimated volumes of buried waste and fill materials to be excavated.
   - Estimated volume of fill material required to be imported to the Site to complete backfilling of the excavation area.
   - Size and configuration of the engineered disposal trench for consolidation of the excavated wastes over the reservoir in Area 2.
   - Engineers cost estimate for implementation of the construction phase of the Focused Excavation Treatability Study.
   - Estimated schedule for the construction phase of the Focused Excavation Treatability Study.
   - Construction plans, specifications and bid documents necessary for the solicitation and evaluation of bids from prequalified EPC contractors for the construction phase of the Focused Excavation Treatability Study.

3.0 HEALTH AND SAFETY

1. The existing Site HSP (TRC, 1997c) has been modified to address hazards associated with the SSI. Changes were made to Sections 1.0, 2.0, 6.2.2, 6.2.4, 6.2.5, 6.2.6, 6.2.7, 6.4.1, 6.4.4, 6.6, 7.7, 8.1, 10.1.6, 10.2.2 and 10.11.8. The HSP Addendum will be submitted

separately. Hazards may include, but are not limited to, chemical exposure, fires, explosions, spills, generation of toxic or asphyxiating gases, physical hazards, electrical hazards and heat stress.

2. An exclusion zone with a radius of 10 feet will be set up around the indoor borings. Employees will not be allowed back into the area until after the boreholes have been sealed and the area has been ventilated. Fans will be set up to encourage ventilation, if necessary. Employees will not be allowed back in until the air monitoring indicates a safe work environment.

3. The exhaust from the indoor drill rig will be connected to a hose vented outside of the building. Building doors and windows will be kept open to provide further ventilation during the work. If air monitoring indicates that increase air flow is necessary to provide a safe work environment, ventilation fans will be set up.

4. Ambient air monitoring will be conducted while work is being performed using a PID and an organic vapor analyzer (OVA). Draeger tubes that are specific for benzene and vinyl chloride will be collected if elevated readings are observed in the breathing zone (measured 5 feet from the boring) on the PID or OVA. Action levels for work stoppage/corrective action are:
   - 10 parts per million (ppm) on an OVA meter.
   - 1 ppm on PID meter.

5. Based on results from the Draeger tubes for benzene and vinyl chloride, the contingencies below will be followed:
   - 0 to Indoor Air Threshold Value : No Action.
   - Indoor Air Threshold Value to 10 times the value: Ventilation.
   - Greater than 10 times the Indoor Air Threshold Value: If a high concentration gas pocket is encountered, discontinue operations and ventilate after drowning the hole with a bucket of premixed grout.

   The Indoor Air Threshold Value for benzene is 2 parts per billion by volume (ppbv) and the Indoor Air Threshold Value for vinyl chloride is 0.25 ppbv.

4.0 SCHEDULE

1. The projected schedule for this Supplemental Subsurface Investigation (SSI) is as follows:
   - SSI Workplan to EPA ..... August 30, 2000
   - EPA Approval ..... September 27, 2000
   - SSI Field Activities ..... October 2 to 15, 2000
   - Technical Exchange Meeting ..... October 12, 2000

5.0 REFERENCES

TRC, 1999. *Remedial Design Investigative Activities Summary Report.* August 1999.

TRC, 1997a. *Revised Supplemental Field Sampling and Analysis Plan (Rev. 2.0).* November 1997.

TRC, 1997b. *Revised Supplemental Quality Assurance Project Plan (Rev. 2.0).* November 1997.

TRC, 1997c. *Health and Safety Plan (Rev. 1.0).* August 1997.

TABLES

TABLE 1

DQO DEVELOPMENT PROCESS
WASTE DISPOSAL, INC.

ACTIVITY	SUBSURFACE SOIL SAMPLING
Objectives	Obtain additional soil chemistry and geotechnical properties data for TM No. 14
Intended Data Use	Information to aid in developing TM No. 14 workplan.
Required Analytical Methods of DQO Levels	VOCs (5035) SVOCs (8270 Pesticides (8080) Metals (see Table 1 in Revised Supplemental QAPP) Moisture Content, Density, Grain Size (ASTM D-2216) Atterberg Limits (ASTM D-4318) Unconfined Compression Strength (ASTM D-2166)) Direct Shear Test (ASTM D-3080) Triaxial Shear Test (ASTM D-2850)
	DQO Level 3(1)
Contaminants of Concern	VOCs, SVOCs, Pesticides, PCBs, and Metals(2)
Required Detection Levels	VOCs(3) SVOCs(3) Pesticides(3) Metals(3)
Action Levels/ Regulatory Standards	See Attachment 3 in QAPP (TRC, 1997b).
Sampling Points	As indicated in Figure 1.
Critical Sampling	Soils nearest to or beneath existing buildings in Areas 1 and 8.

94-256 (Rpts/ReSuFSAP/9/20/tkl/rm)

(1) DQO levels are discussed in Section B.4 of the QAPP (Rev. 2.0), August 1997.
(2) A complete list of contaminants of concern is provided in Table B.1 of the QAPP.
(3) Required detection limits are provided in Table B.1 of the Revised Supplemental QAPP.

TABLE 2

APPLICATION OF THE DQO PROCESS FOR SOIL AND WASTE MATERIAL SAMPLING AND ANALYSIS

DQO STEP[1]	SUPPLEMENTAL SUBSURFACE INVESTIGATION	
	Chemical Characterization of Subsurface Soils	Geotechnical Evaluation of Subsurface Soils
Statement of the Problem	The objectives of the soil and waste chemical characterization activities are: • Evaluation of COCs in areas not previously evaluated. • Evaluation of COCs in areas where additional data is needed for RD purposes. • Evaluation of COCs in areas near occupied onsite buildings in Areas 1 and 8.	The objective of the geotechnical evaluation of the soil and waste materials is: • Evaluation of geotechnical properties (i.e., moisture content, density, grain size and shear strength.
Identify Decisions the Data will be used to Resolve	• Determine if waste material presents a site risk. • Determine if waste materials are above RAOs.	TM No. 14 activities and RI/FS processes.
State the Variable to be Measured	• VOCs (Method 5035) • SVOC (Method 8270) • Pesticides (Method 8080) • PCBs (Method 8080) • Metals (as shown in Table 3)	• Moisture Content (ASTM D-2216) • Density (ASTM D-2216) • Grain Size (ASTM D-2216) • Atterberg Limits (ASTM D-4318) • Unconfined Compressive Strength (ASTM D-2166) • Direct Shear Strength (ASTM D-3080) • Triaxial Shear Strength (ASTM D-2850)
Define Boundaries of the Study Area Including Special and Temporal Units	See Figure 1.	See Figure 1.
Decision Rules	• This data will be used to decide if further data needs to be collected to address specific TM No. 14 issues.	• Geotechnical data will be the basis for selecting specific engineering procedures for TM No. 14.
Uncertainty Constraints for the Decision Process	• Nonhomogeneity of the site. • Loss of volatile VOCs (i.e., vinyl chloride) during the sampling process.	• Nonhomogeneity of the site.
Optimize the Design within the Constraints of Project Goals	Data will be used in the Remedial Investigation/Feasibility Study (RI/FS) process to optimize the design.	Data will be used in the RI/FS process to optimize the design.

94-256 (Rpts//ReSulFSAP 9/21/XX/rw)

(1) DQO steps; guidance for the Data Quality Objective Process. EPA QA/G-4 U.S.EPA 1994.

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TABLE 3

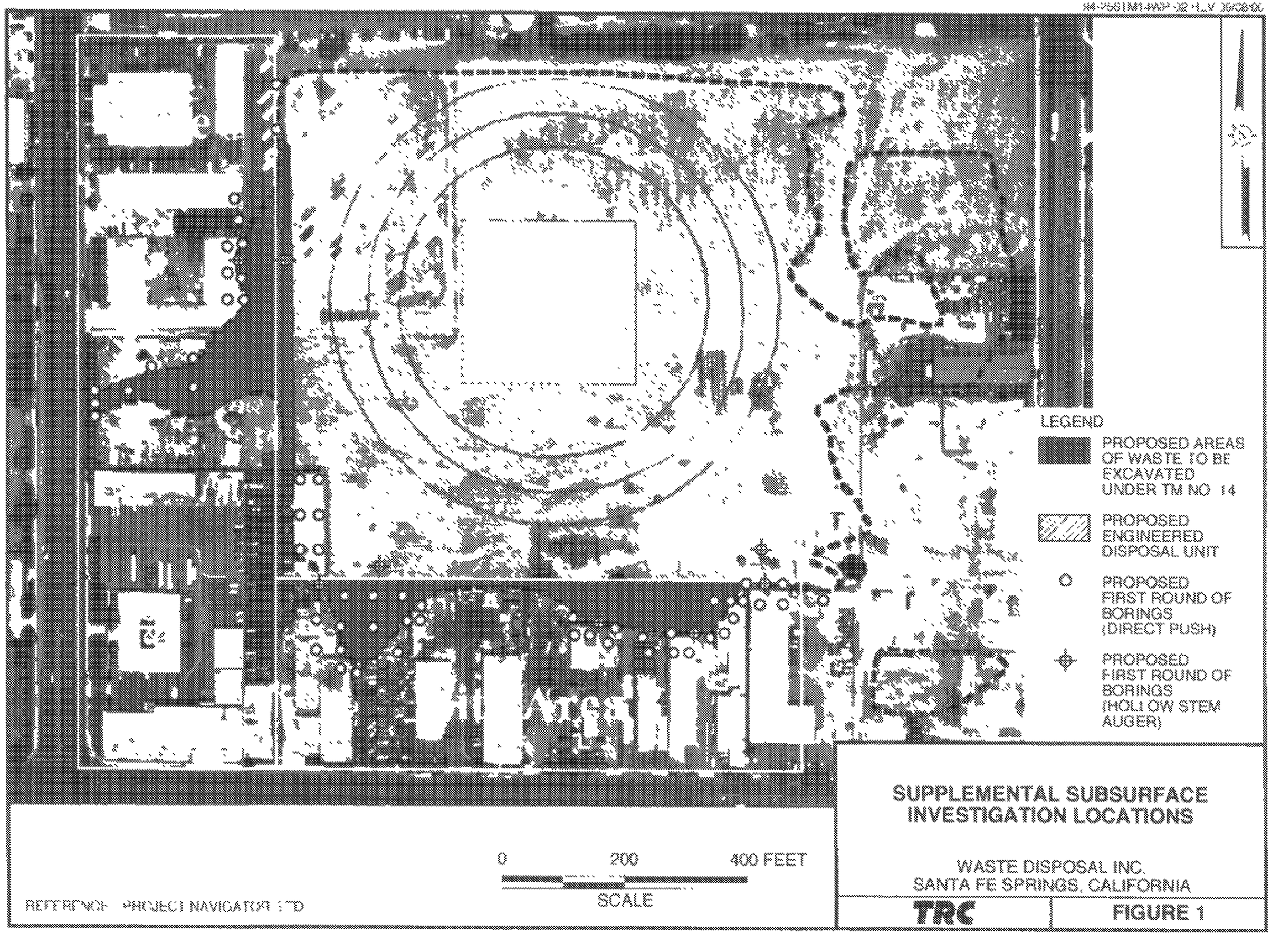
LIST OF METHODS AND SAMPLE MATRICES
WASTE DISPOSAL, INC.

PARAMETER[1]	EPA METHOD	SOIL SAMPLES	WASTE MATERIALS
Laboratory Parameters			
ICAP Metals (Al, Sb, Ba, Be, Cd, Ca, Cr, Co, Fe, Mg, Mn, Mo, Ni, Na, Th, Va, Zn)	6010	X	X
Arsenic	7060	X	X
Lead	7421	X	X
Mercury	7470	X	X
Selenium	7740	X	X
VOCs	5035	X	X
SVOCs	8270	X	X
Pesticides/PCBs	8080	X	X
Total Recoverable Petroleum Hydrocarbons	418.1	X	X
Moisture Content/Density/Grain Size	ASTM-D2216	X	X
Atterberg Limits	ASTM-D4318	X	X
Unconfined Compressive Strength	ASTM-D2166	X	X
Direct Shear Strength	ASTM-D3080	X	X
Triaxial Shear Strength	ASTM-D2850	X	X

94-256 (Rpt\/ReSuFSAP 9/26/00)rw)

(1) Table 2 provides a description of the DQO development process for the constituents of concern. Table 1 provides a list of the relevant requirements used to establish the detection limits for these compounds.

FIGURES



REFERENCE: PROJECT NAVIGATOR LTD

SUPPLEMENTAL SUBSURFACE INVESTIGATION LOCATIONS

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

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FIGURE 1

ATTACHMENT A

STANDARD OPERATING PROCEDURE R
INDOOR GEOPROBE ACTIVITIES FOR THE
SUPPLEMENTAL SUBSURFACE INVESTIGATION

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STANDARD OPERATING PROCEDURE R
INDOOR GEOPROBE ACTIVITIES
WASTE DISPOSAL, INC. SUPERFUND SITE

1.0 GENERAL

1. Geoprobe borings may be completed within existing buildings at the Site in Areas 1 and 8 to supplement existing subsurface soil data and to determine the extent of buried waste beneath the buildings. Geoprobe services will be provided by a licensed driller under subcontract to TRC. Appropriate health and safety, emergency response and Quality Assurance/ Quality Control (QA/QC) procedures are provided in the Appendices of the Remedial Design Investigative Workplan. As much as possible, borings shall be located to cause the least amount of impact to the building owner and/or tenant.

2.0 TASK DESCRIPTION

1. Geoprobe borings may be completed within existing buildings at the Site in Areas 1 and 8 to supplement existing subsurface soil data and to determine extent of buried waste beneath the buildings. The geoprobe borings will herein be referred to as "borings" for the remainder of this Standard Operating Procedure (SOP).

3.0 REQUIRED MATERIALS

1. The field team will consist of a representative of TRC and the geoprobe crew.

2. The subcontract driller will be responsible for providing all drilling equipment and materials.

3. The following materials are required from TRC to perform this procedure:
   - Personal protective equipment (PPE) as described in the Health and Safety Plan.
   - 100-foot measuring tape or measuring wheel.
   - Field Activity Report forms and/or appropriate monitoring data sheets.
   - Timepiece.
   - Pen with indelible ink.
   - A copy of the Workplan describing the work to be performed, including boring locations.
   - Any monitoring equipment, e.g., photoionization detector, OVA- meter, (Equipment referred to in the Workplan.
   - Sampling equipment, containers and labels.

- Decontamination materials, e. g., tap water, deionized water, laboratory-grade detergent, three bottle brushes and three 5-gallon buckets.
- An accurate plan of the site (if available), drawn to scale and including:
  - A north arrow.
  - Locations of exploration sites.
  - Existing structures.
  - Property lines.
  - Adjacent streets.
  - Established benchmarks or permanent landmarks.
- Black permanent marker (e.g., Sharpie Fine Point Marker) for labeling boring locations.
- White surveyor's spray paint for marking exploration locations covered with floor slabs.
- Engineer's scale.

4.0 TASK PERFORMANCE

4.1 SITE UTILITY CLEARANCE

1. Procedures for providing for clearance of existing site utilities are described in this section. To protect the safety of field personnel and existing utilities and to prevent property damage, no borings will be started until proper site utility clearance has been performed to assure that existing utilities and/or structures will not be impacted.

2. The property owner and/or tenant will be contacted to obtain information on existing utilities and structures located at the site. If utility or site plans exist from either the property owner or the tenant, copies will be obtained and reviewed by TRC.

3. A visit will be made to the site to mark the location of each proposed boring. In the field, each proposed boring location will be checked against utility or site plans provided by the property owner and/or tenant to assess that the proposed boring locations are not situated where they might contact an underground utility or structure. The proposed boring locating must also be located far enough away from any at-grade or overhead utility or structure such that there are no safety or equipment access concerns. If any proposed boring locations are in conflict with existing utilities or structures, the location will be shifted as pre-agreed with the project or task manager, or the project or task manager will be called to obtain a decision as to where the proposed boring location is to be moved.

4. The boring location is to be marked and labeled on the floor slab with white surveyor's spray paint.

5. After marking the boring locations in the field, Underground Service Alert (USA) will be contacted at 1-800-422-4133 on Monday through Friday between 7:00 a.m. and 5:00 p.m. Provide USA the following information:

   - Name and e-mail address and TRC's name, address, telephone number, and fax number.
   - The client's name, i.e., the Waste Disposal, Inc. Group.
   - The date and time for which the exploration work is planned. **Give USA a minimum of 2 working days notice and, if the exploration work will extend for over 14 days, renew the notice before continuing beyond the 14th day.**
   - The site address and location including the Thomas Brother's map book page and grids for the project site and the nearest cross-street.
   - A description of the type of work planned.
   - Any applicable permit numbers.
   - Any special instructions you want conveyed to the utility locators.

6. If requested by USA or one of the utility locators, another visit will be made to the site to meet with the utility locators to discuss the proposed boring locations.

7. Before the proposed boring activities are started, each location will be reviewed in light of the utility location indications marked in the field by the utility locators. If any proposed exploration location appears to be located over an underground utility or structure, it shall be shifted to a clear area as agreed with the project or task manager.

8. Existing maps of underground utilities and structures should never be considered to be completely accurate. If after following the above procedures, there is any uncertainty that a proposed exploration location is clear of underground utilities and structures, the specific location(s) should be checked by a licensed geophysical exploration firm. In addition, the first 5 feet of the borings will be made using hand auger techniques.

4.2 VENTILATION

1. If drill rigs powered by internal combustion engines are used, a hose will be connected to the exhaust pipe and extended outside the building.

2. Doors and windows of the building will be kept open while drilling equipment is operating.

3. The breathing zone will be monitored by TRC while drilling and sampling work is being performed. If the air monitoring indicates unsafe levels of contaminants in the work area, drilling will be stopped and ventilation fans will be set up and operated. Work will not resume until safe levels are established.

4.3 FLOOR SLAB PENETRATIONS

1. If possible, floor coverings (e.g., carpeting) will be removed from boring locations prior to the start of work. Removed floor coverings and furniture or material belonging to the building owner and/or tenant will be put back in place upon completion of the exploration work. Floor coverings, furniture and materials that have been damaged by the exploration activities will be repaired or replaced.

2. An access hole for the geoprobe will be cut in the floor slab. This hole will be approximately 4-inches in diameter. It will be cut using a concrete cove drill or a jack hammer.

3. Following completion of drilling and sampling activities, the access hole cut in the floor slab will be repaired using high-strength concrete grout.

4.4 PROBE BOREHOLE

1. Each boring will be drilled vertically to the depths specified in the Workplan using a direct push geoprobe. Each boring will be continuously sampled.

2. An exclusion zone will be set up around the borings. If a hot gas pocket is hit, a bucket of premixed grout will be used to drown the hole.

3. The samples will be field analyzed as described in the Field Sampling and Analysis Plan (FSAP).

4. The subsurface conditions encountered during drilling will be recorded on a boring log form. Observations to be recorded include:
   - Soil type.
   - Sample depths and numbers.
   - The depth of any buried waste encountered.
   - Moisture conditions.
   - Gas conditions.
   - Method of drilling.
   - Total depth of boring.
   - Method of backfilling completed borehole.

5. Completed boreholes will be backfilled with bentonite chips which will be hydrated with potable water.

4.5 PROBE SAMPLING PROCEDURES

1. Each boring will be continuously sampled to the termination depth.

2. Samples will be examined for lithologic descriptions and observations will be recorded on the boring log.

3. Soil samples from two depths, one from the fill above the waste and one from native site soil beneath the waste, will be retained from each boring for possible laboratory analysis.

4. Soil samples not retained for possible laboratory analysis will be placed into 55-gallon drums and stored in Area 2. Ultimately these drummed cuttings will be placed into the engineered disposal trench over the reservoir in Area 2 along with waste excavated during the TM No. 14 treatability study.

4.6 SAMPLE IDENTIFICATION PROCEDURES

1. Each sample retained for possible laboratory analysis will receive a label. Sample labels identify the sample by documenting the unique sample identification number, the sample type, the client, the sampler's name(s), and the date and time collected. Samples will be identified as having originated from the Site by prefacing each sample designation with "WDI" (for Waste Disposal, Inc.), will be identified by an alpha and numerical code, and will have an additional two-digit number as the last component of the sample identifier. The two-digit number will correspond to the sample depth. The sample identifier is illustrated below:
   - WDI-SBIDP-01-05: Supplemental Boring Indoor Direct Push No. 01, sample depth 5 feet.

2. Once prepared, the label will be affixed to the sample container. Clear plastic tape will be used to cover the label to prevent loss of the label and to prevent the label contents from becoming illegible.

3. Sample numbers will be recorded on the boring log.

4.7 ANALYTICAL PARAMETERS, METHODS AND SAMPLE PRESERVATION

1. Information on analytical parameters, sample containers, methods of preservation, and holding times are specified in the Quality Assurance Project Plan (QAPP).

4.8 BLANKS AND DUPLICATE SAMPLE PROCEDURES

1. Soil sampling requires trip blanks (VOCs), equipment rinsates and field duplicates for Quality Control (QC) purposes.

4.9 SAMPLE PACKAGING AND TRANSPORTATION

1. Samples will be packed in the following manner for shipment. Detailed transportation procedures are provided in SOP H.
   - A custody seal will be placed on each sample container.
   - Each sample container will then be wrapped in bubble pack or other packing material, placed in separate, sealable plastic bags, and then placed in an ice chest precooled to 4 degrees Celsius (°C) with Blue Ice® packages or double-bagged ice packets.
   - The completed Chain-of-Custody record going to the laboratory will be placed in a sealable plastic bag, which will then be placed in the cooler.
   - The cooler lid will then be taped shut with strapping/packaging tape.
   - A custody seal will be completed, signed and attached to the lid and the front of the cooler for hinged coolers. Two custody seals will be attached to coolers with removable lids. One will be attached to the front and one to the back of these coolers.
   - The coolers will be hand-delivered or shipped via overnight carrier to the laboratory at the end of each day's sampling. Samples will be shipped in a manner such that the laboratory will receive them within 24 hours or less from the actual sampling times, depending on the holding times.

4.10 PROCEDURES TO AVOID SAMPLE CONTAMINATION

1. Precautions will be taken to limit the contamination of samples from outside sources. Hands will be washed with distilled water, and rubber surgical gloves will be worn.

4.11 SAMPLE DOCUMENTATION AND LABELING PROCEDURES

1. Perform sample documentation in accordance with the procedures in the Field Sampling and Analysis Plan (FSAP) and SOP J. In addition, immediately record monitoring and measurement data in the Field Activity Report and/or an appropriate monitoring data sheet.

4.12 CHAIN-OF-CUSTODY PROCEDURES

1. Chain-of-Custody procedures which are discussed in the QAPP and in SOP I will be used to maintain and document sample possessions. The Chain-of-Custody record will be initiated at the time of sampling and will contain the sample number, date and time, name and dated signature of the person taking the sample, as well as the methods by which each sample will be analyzed, and other pertinent information.

2. Sample transfers will be noted on the record sheet for each sample. Standardized Chain-of-Custody forms will be used for tracking samples for the point of origin in the field through laboratory processing and disposal.

3. More than one sample may appear on a Chain-of-Custody form. The form will accompany the samples, attached within the ice chest. One copy of each form will be retained by field personnel prior to shipment of the samples to the laboratory. An example Chain-of-Custody form is presented in Figure B.2 of the QAPP and Table 1 of SOP I. Copies of the Chain-of-Custody records completed by the laboratory will be returned with the results of laboratory analyses.

4. For specific Chain-of-Custody procedures, refer to SOP I.

ATTACHMENT B

DRAFT REVISED SUPPLMENTAL FIELD SAMPLING
AND ANALYSIS PLAN (REVISION 2.0) ADDENDUM

TRC
Customer-Focused Solutions

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LIST OF FIGURES

1.0 INTRODUCTION

1. The Revised Supplemental Field Sampling and Analysis Plan (Rev 2.0) (FSAP) (TRC, 1997a) has been modified to support field activities of the Supplemental Subsurface Investigation (SSI) (TRC, 2000a) and Technical Memorandum No. 14 Draft Preliminary (10%) Workplan Focused Excavation Treatability Study (TM No. 14) (TRC, 2000b) for the Waste Disposal, Inc. (WDI) Superfund Site (Site) in Santa Fe Springs, California.

2. Since this FSAP is an addendum to the Revised Supplemental FSAP (TRC, 1997a), project descriptions and project organization chapters are not repeated here. Standard Operating Procedures (SOPs) for various elements of the work are included as attachments to the Revised Supplemental Quality Assurance Project Plan (Rev 2.0) (QAPP) (TRC, 1997b).

3. This addendum is organized as follows:
   - Section 2.0 - Sampling Objectives
   - Section 3.0 - Rationale for Sampling
   - Section 4.0 - Analysis Requirements
   - Section 5.0 - Methods and Procedures
   - Section 6.0 - References

2.0 SAMPLING OBJECTIVES

1. The primary purpose of the proposed soil sampling and analysis program is to obtain Site-specific data regarding the chemical and physical characteristics of the fill material, buried waste, native soils and their relationships to existing onsite structures.

2. Objectives of the proposed sampling include:
   - Identify extent of buried waste near or beneath onsite structures in Site Areas 1 and 8. This information will be used to calculate volumes of waste and fill material that will be excavated during TM No. 14 activities.
   - Evaluate fill material, buried waste and native soil for chemicals of concern (COCs) near and/or beneath onsite structures in Site Areas 1 and 8. This testing will verify that the concentration of any COCs in these materials is below the remediation goals for the Site. Hence, verifying that, from a geochemical standpoint, the overlying fill soils can be reused for backfilling the excavations and that the native soils can be left in place.
   - Evaluate fill material, buried waste and native soil for geotechnical properties (i.e., moisture content, density, grain size and shear strength). This testing will determine the geotechnical properties that will be used during the design phase of TM No. 14 (i.e., slope stability analysis and shoring or underpinning systems design).

3. Summarized in Table 1 are the Data Quality Objectives (DQOs) for the various Site media. Provided in Table 2 is a description of the DQO process for the proposed soil and buried waste material, sampling and analysis. DQOs are discussed in greater detail in Section 4.0 of the Revised Supplemental QAPP (TRC, 1997b).

3.0 RATIONALE FOR SAMPLING

3.1 APPROACH

1. As outlined in the SSI workplan, the primary purpose of the field investigation activities is to obtain Site-specific data required to complete the 30% workplan that will be used as a bidding document for TM No. 14. Sampling activities to be completed during the SSI may occur in several phases. The first phase will be the collection and analysis of subsurface soil samples from the areas indicated in Figure 1. A subsequent phase of investigation may be performed if significant data gaps still exist following completion of the above test borings and sample analyses. Select samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs) and total metals. In addition, selected samples will be collected and tested for geotechnical purposes.

2. Areas for chemical and geotechnical analysis were selected based on the following criteria:
   - Buried waste adjacent to or beneath onsite buildings in Areas 1 and 8.
   - Locations in Areas 1 and 8 with significant data gaps.
   - Locations representative of various thickness' of the waste layer and the overlying fill layer.

3. The sampling program that will be used during these field activities will incorporate the following strategies:
   - Follow appropriate protocols in the Health and Safety Plan (HSP) (TRC, 1997c) to minimize exposure to potentially contaminated media.
   - Follow labeling protocols for each sample collected. Detailed protocols are provided in the Revised Supplemental QAPP (TRC, 1997b).
   - Place samples in laboratory-certified clean receptacles.
   - Adhere to field sample collection and handling procedures as described herein, and supported by Quality Control (QC) measures provided in the Revised Supplemental QAPP (TRC, 1997b).
   - Follow sample packaging and Chain-of-Custody protocols to assure that samples which may be analyzed, are delivered to the laboratory and stored appropriately. Detailed protocols are provided in the Revised Supplemental QAPP (TRC, 1997b).

4. The Environmental Protection Agency (EPA) will be notified not less than 14 days in advance of sample collection activity.

3.2 SOIL SAMPLING

1. Figure 1 shows the general site configuration and proposed boring location in Areas 1 and 8. Conventional drilling techniques (i.e., hydraulically pushed borings [HPB] and hollow-stem auger drilling) will be used to complete the borings. Based on a review of the Site soils in an areas to be sampled, it appears that HPBs will be suitable for shallow (approximately 20 feet deep) borings because of their low mobilization and operating cost requirements. The hollow-stem auger drilling rig will be used for deeper borings required to obtain geotechnical samples.

2. Soil samples from the HPB will be obtained using a geoprobe or equivalent unit mounted on a small limited access rig for indoor borings or on a small 4-wheel drive truck for the remaining boring, which provides a 1-1/2-inch outside-diameter by 3-foot stainless steel hollow sampler tube with a clear polyacrylate inner sleeve. The sampler/sleeve will be advanced into the soils at 3-foot intervals using static hydraulic force coupled with a percussion hammer, where necessary and then hydraulically removed from the hole. The polyacrylate sleeve will then be removed, capped and taped. The sampler will then be reloaded with a new sleeve and advanced through the next 3-foot interval to provide continuous sampling to the total depth of the hole. To the extent possible, the recovered soil type will be logged by visual observation of the material in the sleeve. If necessary, materials may be removed from the sleeve ends to assist in material characterization. In that event, the tube will be recapped and taped prior to being placed in a cooler for temporary storage.

3. One-half of samples obtained for geotechnical analysis will be collected using a 2-1/2-inch inside-diameter, ring-lined split-spoon sampler. These samples shall be obtained in general accordance with American Society of Testing and Materials (ASTM) Procedures D1586 and D3550. The other half of the samples shall be obtained using a 3-inch-diameter thin-wall tube sampler in general accordance with ASTM Procedure D1587.

4. Each sample will be logged and analyzed with an Flame Ionization Detector (FID) in the field. The observations and results will be recorded on the Field Boring Log including:
   - Description: Soil samples collected will be examined for the following physical parameters: depth, color, texture, lithology, moisture, odor and indications of contaminations (e.g., staining).

- Headspace Analysis: For the split-spoon sampler, half of the soil volume in the middle or bottom stainless steel or brass sleeve will be removed and placed inside a small resealable plastic bag. For the HPB, material from either end of the 3-foot polyacrylate sleeve will be removed from the sampler as described above. For either sampling procedure, the bags will be left in the sunlight for approximately 15 to 30 minutes, after which time the headspace will be analyzed using an FID to measure potential volatile contamination.

The terminology and procedures of the Unified Soil Classification System (USCS) will be used to describe samples.

4.0 ANALYSIS REQUIREMENTS

4.1 REQUEST FOR ANALYSIS

1. Sampling for the SSI is anticipated to occur in October 2000. Table 1 of the Revised Supplemental QAPP (TRC, 1997b) provides a summary of the analytical procedures for soil samples, including analytical quality assurance (QA) control limits, and detection limits for each parameter. Selected samples will be collected and analyzed for total metals, VOCs, SVOCs, PCBs and pesticides. In addition, selected samples will be collected and tested for geotechnical purposes.

4.2 MONITORING/TESTING FREQUENCIES

1. Soil samples will be collected on a one-time basis from the locations indicated in Figure 1. Additional samples may be needed from other locations if significant data gaps still exist following completion of the first phase of sampling.

4.3 ANALYTICAL PROCEDURES

1. Analytical procedures of subsurface soil samples are presented in the Revised Supplemental QAPP (TRC, 1997b) and in general accordance with ASTM procedures D2166, D2216, D3080 and D4318. A summary of the methods to be used is provided in Table 3.

2. If during the analysis for pesticides and PCBs (EPA Method 8080), the matrix spike recovery levels are below the Quality Assurance/Quality Control (QA/QC) criteria, EPA Method 3665A will be used for the PCB analysis.

4.4 ANALYTICAL PARAMETERS, SAMPLE CONTAINERS, METHODS OF PERSERVATION AND HOLDING TIMES

1. Information on analytical parameters, sample containers, methods of preservation, and holding times are presented in Table 1 of the Revised Supplemental QAPP (TRC, 1997b).

2. Table 2 of the Revised Supplemental QAPP (TRC, 1997b) provides a list of the Quality Control Samples to be collected and their respective frequencies.

5.0 METHODS AND PROCEDURES

5.1 SAMPLE COLLECTION

5.1.1 INTRODUCTION

1. The following sections describe the field sample collection methods and procedures that will be implemented during the SSI.

5.1.2 SUBSURFACE SOIL SAMPLES

5.1.2.1 Subsurface Soil Sampling Locations and Underground Utility Clearance

1. Prior to drilling, locations of the proposed borings will be marked with wooden stakes as measured from a definable Site feature for easy conversion to Site plans and figures. A survey crew may be procured if this procedure proves to be too difficult or the accuracy is not adequate. Underground Service Alert (USA) will be contacted and utilities marked. Boreholes without utility interferences will be given "clearance" by marking (flagging) the stake with yellow tape.

2. Drilling will only be performed at "cleared" staked locations. If areas are deemed questionable, borings will be moved to the nearest location that can be cleared. In the unanticipated event that an essential boring cannot be cleared, a geophysical survey or other pipeline locating method may be performed to determine position of potential utilities and lines. However, geophysical methods may not be able to detect utilities lacking ferrous (iron) elements and the proposed borings would also require checking the area using hand augering techniques to a depth of 5 feet below ground surface (bgs).

5.1.2.2 Borehole Drilling for Subsurface Soils

1. Primary methods for soil sampling will include the use of a HPB system using a polyacrylate inner sleeve and a hollow-stem auger using a 2-1/2-inch inside-diameter split-spoon sampler and 3-inch diameter thin-walled tube sampler. During sampling, the soils will be evaluated and logged as indicated in SOP A for soil type and characteristics. (See Revised Supplemental QAPP [TRC, 1997b]).

2. Borehole cuttings will be disposed pursuant to the procedures described in Section 5.3.

5.1.2.3 Sampling

5.1.2.3.1 Chemical Analysis

1. Soil samples for chemical analysis will be collected from the polyacrylate sleeve and split-spoon sampler, immediately upon retrieval from the subsurface and placed into an unpreserved vial, as per section 2.2.1 of EPA Method 5035 for high VOC concentration samples. A portion of this sample will then be accurately weighed into the pre-made preserved vial for analysis as per section 6.2 of Method 5035 using an EnCore™ sampler or equivalent. Care shall be taken to avoid disturbing the sample in order to minimize the loss of the volatile components. Soil samples will be analyzed using EPA Method 5035 (closed system purge and trap extraction for VOCs in soil and waste samples) and consists of the following elements:

   - Retrieval of samples.
   - Field extraction of samples using methanol.
   - Laboratory completion of extraction and analysis.

   Because the sealed sample cannot be opened to remove a sample aliquot without compromising the integrity of the sample, multiple sample aliquots will be collected to allow for screening and reanalysis. A copy of EPA Method 5035 is provided in the QAPP (TRC, 1997b) as SOP O.

2. The laboratory will collect samples for SVOCs, pesticides, PCBs, and total metal analyses from sealed polyacrylate tubes and split-spoon sleeves.

3. All samples for analytical testing will be labeled and cooled to approximately 4 °C, packed in appropriate containers and shipped to the laboratory on ice as discussed in SOP H in the Revised Supplemental QAPP and ASTM Procedure D-4220.

5.1.2.3.2 Geotechnical Analysis Using ASTM Procedures D1586 and D3550

1. Samples shall be obtained at 5 foot intervals alternately using split-spoon sampler lined on the inside with removable rings and thin-walled tube samplers (described below). The rings shall be thin-walled, and have 2-1/2-inch inside-diameter. They shall fit snugly inside the sampler with no discernible free play in any direction. The sampler and rings shall be free of bumps, dents, scratches, rust, dirt and corrosion. It is recommended that the sampler contain at least six rings in order to provide samples for a variety of tests.

2. The split-spoon sampler will be driven 18 inches into the soil using a 140-pound (lb) hammer falling 30 inches. The number of blows applied for each 6-inch increment will be counted and recorded.

3. The split-spoon sampler shall be disassembled in such a manner as to minimize soil disturbance as much as possible. The percent recovery or length of sample recovered should be recorded. Trim the soil flush with the ends of the sampling barrel, and remove the specimen (consisting of soil plus rings). A container will be slipped over the specimen-filled rings and both ends capped, being certain that there is no movement of the specimen-filled rings inside the container and that the specimen was not disturbed while being removed from the barrel and placed in the container.

4. If the soil in the bottom end ring does not protrude from the ring after removing the shoe, do not use the soil in the bottom ring for tests other than soil classification, moisture content and analytical chemistry. If the top ring or rings contain voids, depressions, or any material other than the soil that is being sampled, do not use the soil in this ring or rings for any purpose whatsoever. Filling of depressions in the end rings with additional soil shall not be permitted. Samples that appear to be disturbed or questionable shall be discarded.

5. Examine the soil remaining in the shoe for structure, consistency, color and condition. Record these observations on the boring log.

6. Label the samples and transport samples according to ASTM Procedure D-4220 and SOP H in the Revised Supplemental QAPP (TRC, 1997b).

5.1.2.3.3 Geotechnical Analysis Using ASTM Procedure D1587

1. The 3-inch-diameter thin-walled tube sampler will be pushed 30 inches into the soil using the hydraulic system on the drill rig.

2. The sampler will be withdrawn from the formation as carefully as possible in order to minimize disturbance of the sample.

3. Upon removal of the tube, the length of sample in the tube shall be measured. Remove the disturbed material in the upper end of the tube and measure the length again. Seal the upper end of the tube. At least 1 inch of material should be removed from the lower end of the tube to use for soil description. Measure the overall sample length and seal the lower end of the tube. Alternatively, after measurement, the tube may be sealed without removal of soil from the tube if so directed by the field Geologist or Engineer.

4. Label the samples and transport samples according to ASTM procedure D4220 and SOP H in the Revised Supplemental QAPP (TRC, 1997b).

5.2 DECONTAMINATION

5.2.1 EQUIPMENT DECONTAMINATION

1. Auger flights (including hand augers, hollow-stem augers and HPB units) will be decontaminated prior to and between drilling each borehole by steam cleaning or high pressure hot water cleaning. Equipment decontamination procedures are described in detail in SOP G in the QAPP (TRC, 1997b).

2. A trailer or other rig especially designed for decontamination of augers, drill rods and sampling tools that contains all resulting liquids or a containment area onsite to prevent liquids from leaking or spilling on the ground surface will be used during the sampling. The decontamination water will be pumped into 55-gallon U.S. Department of Transportation (DOT)-approved drums. Each drum will be sealed and labeled as decontamination water. Drums will be staged in Area 2 and disposed of properly at the end of TM No. 14 activities.

3. The HPB rig or hollow-stem auger rig may be decontaminated at anytime during the sampling program, if the field Geologist or Engineer believes the integrity of the borings may be affected by contaminated conditions on the rig. Decontamination will consist of steam cleaning or high pressure washing of truck wheels, chassis and/or other affected rig components.

4. Nondisposable sampling equipment will be decontaminated at a central location where it was used. Decontamination fluids will be collected for proper disposal.

5. The following is a general decontamination procedure for field equipment used in the subsurface investigation:

- Remove soil and place into drum.
- Wash and scrub with non-phosphate detergent.
- Tap water rinse.
- 0.1M nitric acid rinse (when cross contamination from metals is a concern).
- Deionized/distilled water rinse (when SVOCs and non-SVOC contamination may be present).
- Isopropyl alcohol rinse.
- Deionized/distilled water rinse.
- Organic-free water rinse.
- Air dry.
- Wrap in aluminum foil, shiny side out, for transport.

5.3 DISPOSAL OF SOIL CUTTINGS AND ASSOCIATED SAMPLING WASTES

1. Contaminated or potentially contaminated field materials used or generated as a result of field activities proposed in the SSI will be managed in accordance with the Waste Materials Disposal Plan (TRC, 1997d). These materials include disposable items such as used clothing and respirator cartridges, soil cuttings, decontamination liquids and associated sampling wastes. Source, volume and description of these materials will be accurately recorded in the field logbook.

2. Soil samples not selected for analysis and drill cuttings will be placed into open-top 55-gallon DOT-approved drums. Each drum will be sealed and labeled with a borehole identification number, sampling depth interval, and date of storage. Drums will be staged in Area 2 and the soils will be disposed with the buried waste excavated from Areas 1 and 8 during TM No. 14 activities.

3. Disposable personal protective equipment (PPE) will be placed in separate drums. The contents and their origin will be clearly labeled on each drum. Each drum will be affixed with a permanent and unique number on the top and sides of the drum.

4. Drums used for waste materials storage will be kept onsite in a designated storage area in Area 2 until the completion of the project. Drums will be placed on pallets and covered with plastic sheeting. The storage area will be designated using high-visibility barrier tape.

5.4 SAMPLE CONTAINERS

1. Table 1 of the Revised Supplemental QAPP (TRC, 1997b) lists the sample container requirements appropriate for the analytical procedures.

2. Each sample container will be labeled with the name of the person taking the sample, sample date and time, sample identification code, sample type, preservation method, and analyses to be performed. The label will also indicate if the sample is to be held in appropriate storage by the laboratory until the field Geologist/Engineer determines if analyses are to be performed based on initial analytical results for representative samples.

5.5 SAMPLE PRESERVATION

1. Appropriate sample containers and preservatives will be supplied by the analytical laboratory or equivalent reputable source. A listing of these containers, preservation methods, and associated holding times are provided in Table 1 of the Revised Supplemental QAPP (TRC, 1997b).

5.6 SAMPLE SHIPMENT

1. The samples will be packed following the detailed sample transportation procedures described in ASTM Procedure 4220D and SOP H in the Revised Supplemental QAPP (TRC, 1997b).

5.7 SAMPLE DOCUMENTATION

5.7.1 SAMPLE IDENTIFICATION

1. Each sample collected will be identified as having originated from the Site by prefacing each sample with "WDI" for Waste Disposal, Inc. Each sample will be further identified using the sample designation "SB" for Supplemental Boring, and "DP" for Direct Push, "HS" for Hollow Stem, or IDP for Indoor Direct Push as indicated below.

5.7.2 SAMPLE LOCATION, DEPTH AND IDENTIFICATION

1. Each sample collected will be identified by an alpha and numerical code, corresponding to the sample media and number as illustrated below:
   - WDI-SB-DP-01-05 – Supplemental Boring Direct Push 1 at 5 feet.
   - WDI-SB-HS-02-10 – Supplemental Boring Hollow Stem 2 at 10 feet.
   - WDI-SB-IDP-03-15 – Supplemental Boring 3 at 15 feet.

5.7.3 CHAIN-OF-CUSTODY

1. Chain-of-Custody procedures discussed in SOP I of the Revised Supplemental QAPP (TRC, 1997b) will be used to maintain and document sample possession.

5.7.4 FIELD NOTEBOOK

1. The Field Engineer/Geologist collecting the samples will record the portions of the following information for each sample collected as appropriate for the sample type, using indelible ink, in a field logbook or on a field data sheet.
   - Name of sampler.
   - Sample identification number(s).
   - Physical conditions during sampling.
   - Climatic conditions.
   - Date and time of collection.
   - Sample collection procedure/equipment.
   - Sample identification and volume of sample(s).
   - Type of sample containers used.
   - Parameters requested for analysis.
   - Duplicate samples collected and identification numbers.
   - Field observations.
   - Decontamination procedures.
   - Name of courier and laboratory.

2. Detailed field documentation procedures are presented in SOP J in the QAPP (TRC, 1997b).

6.0 REFERENCES

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TRC, 2000b. *Technical Memorandum No. 14 Draft Preliminary (10%) Workplan Focused Excavation Treatability Study*. August 2000.

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TRC, 1997d. *Waste Materials Disposal Plan (Rev. 2.0).* October 1997.

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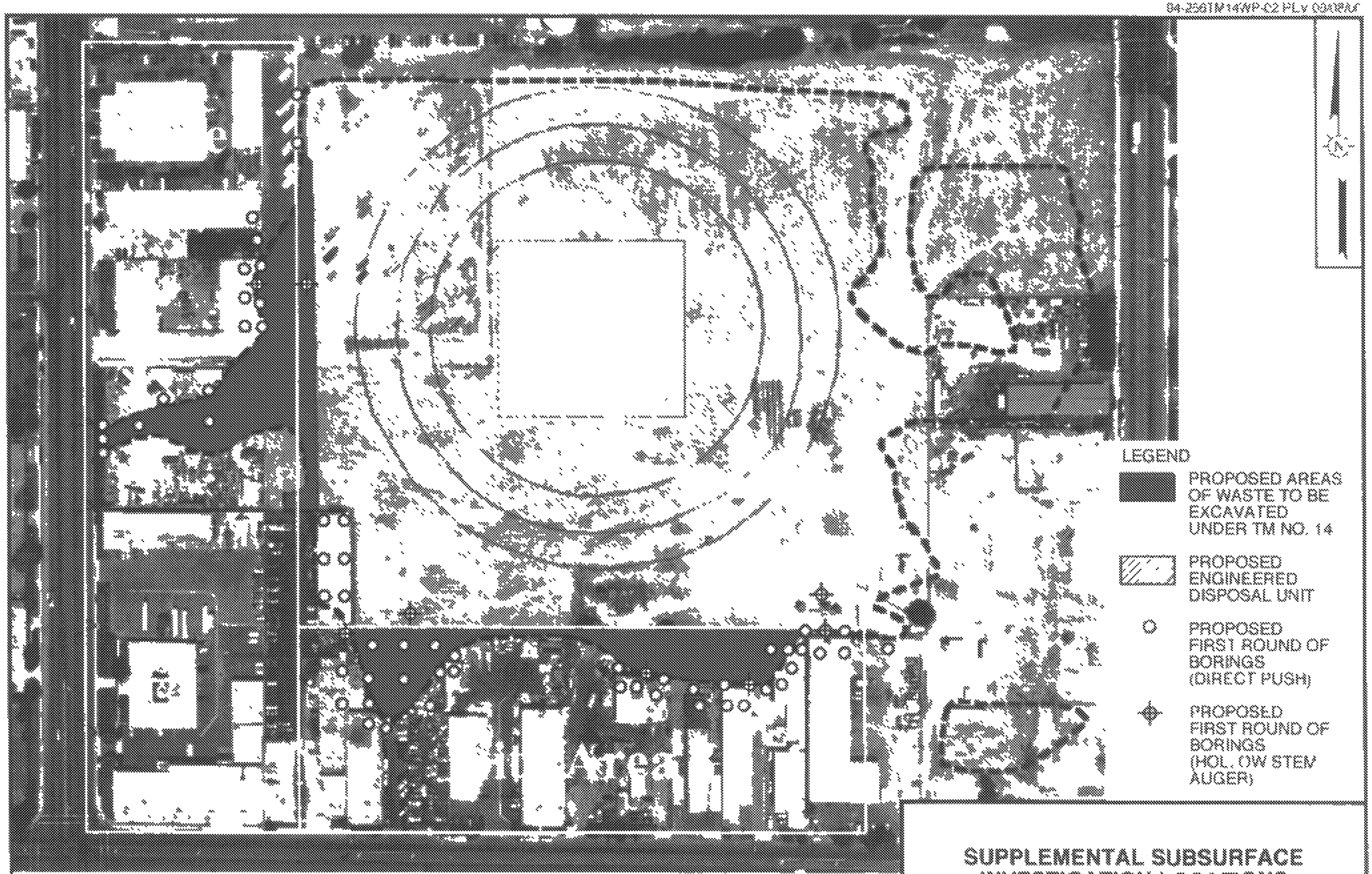

SUPPLEMENTAL SUBSURFACE INVESTIGATION LOCATIONS

WASTE DISPOSAL INC
SANTA FE SPRINGS, CALIFORNIA

REFERENCE: PROJECT NAVIGATOR, INC.

TRC

FIGURE 1

TRC

Customer-Focused Solutions